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In Search of the "How" of Dynamic Capabilities in Digital Transformation: Contradictions as a Source of Understanding

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Abstract

Digital transformation (DT) of the society causes companies to face complex changes and uncertainties. New technologies enable novel forms of operation, but they also inflict new organizational capability requirements. Dynamic capabilities (DCs), the organizations' ability to sense and seize opportunities and to transform, are often seen as a key to remaining competitive in the constantly changing environment. However, further empirical understanding on how DCs develop in organizations particularly in the context of DT is required. This ongoing qualitative longitudinal case study aims to address this need. As findings, the paper presents three types of contradictory phenomenon between supporting and hindering change during a transformation process in a case company. The contradictions illustrate how dynamic and operational capabilities may evolve together with change across the organization. The findings indicate the DC to be a multi-level construct and propose new empirical insight into DC development in digital transformation.

Keywords

Digital transformation, dynamic and operational capabilities, contradictions, case study, multi-level.

Introduction

Organizations today face complex changes and uncertainties caused by disruptive technologies. New "digital resources" enable novel business and operation models characterized by data utilization, connectivity, and digitization of products and services. (Bharadwaj et al. 2013) As part of this *digital transformation* (DT), organizations aim to strategically respond to the disruptions to capture and create new avenues of value creation. This often involves profoundly transforming businesses and utilizing combinations of digital technologies, also inflicting new capability requirements. (Vial 2019) Many related streams in information systems (IS) and management research address the question of remaining competitive in environments of varying levels of turbulence, including aligning strategic business and information technology (IT) (Karpovsky and Galliers 2015), co-evolving with the competitive landscape (Tanriverdi et al. 2010), IT-enabled organizational agility (Tallon et al. 2019), and developing digital business strategies (Bharadwaj et al. 2013). *Dynamic capabilities* (DCs), organizations' capability to sense and seize opportunities and to transform accordingly, are regarded as essential enablers of competitive advantage in the constantly changing environment (Teece et al. 2016). Despite distinguished prevailing DC research, especially from managerial and theorizing perspectives (e.g., Teece et al. 2016), the literature indicates important unknown areas remain. A recent empirical study encourages searching for new understanding on how DCs operate in different industry and transformation settings (Yeow et al. 2018). Moreover, longitudinal DC research (Daniel et al. 2014) and how DCs contribute to digital transformation (Vial 2019), as well as studies investigating the multiple levels of organizations (Salvato and Vassolo 2018) have been called for. We address the identified need by asking *How do organizations' dynamic capabilities develop in digital transformation?*

The paper reports initial findings of the first phase of an ongoing, qualitative longitudinal case study. The study explores the capability development of an organization undergoing major changes characteristic of

DT. Initial findings suggest three types of emerging contradictory phenomenon (cf. Fairhurst and Putnam 2019) between supporting and hindering the desired change. We propose that, together, they provide insight into how organizational capabilities may evolve as interplay between operational capabilities (Pavlou and El Sawy 2011) and DCs through participation and productive dialogue (Salvato and Vassolo 2018). By this we contribute to understanding how the reconfiguration of operational capabilities (Pavlou and El Sawy 2011) can be supported by managerial DCs, particularly in situations of intensive change. When successful, managerial DCs may alter operational capabilities, which in turn have the potential to enrich cross-organizational DCs. This would point towards the problematization of the "in-house assumption" (Alvesson and Sandberg 2011) of viewing DCs chiefly as managerial capabilities. On the contrary, the findings indicate the DC to be a multi-level construct (Salvato and Vassolo 2018), manifesting differently with job responsibilities.

Theoretical Underpinnings

IS capability, the "ability to acquire, deploy, and leverage [a firm's] IT resources to shape and support its business strategies and value chain activities" (Bharadwaj et al. 2002 in Karpovsky et al. 2014), has a significant impact on organizational performance. However, in today's technology-intensive environment, IS capability, like IS itself, is understood as pervasive, interwoven with other key capabilities formed of the resources and competencies at the disposal of organizations. (Peppard and Ward 2004) For instance, IT units require understanding of business functions and strategic goals, and in turn, business functions need advanced technological understanding (Vial 2019). Resources are required to execute capabilities, and the use of resources depends on the quality of capabilities (Daniel et al. 2014). This indicates that capabilities co-evolve together with an organization's actions, resources and environment (cf. Tanriverdi et al. 2010). Thus, we explore capabilities through a comprehensive lens, namely, that of DCs.

DCs evolved from the resource-based view (Barney et al. 2001) of turbulent environments requiring constant realignment of strategic directions for competitive advantage (Teece et al. 2016). In literature, DCs are much debated and varyingly parsed making their empirical research challenging (Peteraf et al. 2013). While operational capabilities enable daily business activities (Pavlou and El Sawy 2011), DCs alter "internal and external competences" (Teece et al. 2016). They are also seen as a "learned and stable pattern of collective activity" to create operating routines for "improved effectiveness" (Zollo and Winter 2002). A contrasting view regards them as "best practices" and, as such, "necessary, but not sufficient, conditions for competitive advantage" (Eisenhardt and Martin 2000). While acknowledging this debate, we adopt two nuanced views fit for cross-organizational enquiry. The first models DCs through a central management objective of reconfiguring operational capabilities for a changing environment. The four interacting DCs are *sensing* "to spot, interpret and pursue opportunities in the environment", *learning* "to revamp existing operational capabilities with new knowledge", *integrating* "to combine individual knowledge into the unit's new operational capabilities" "by creating a shared understanding and collective sense-making", and *coordinating* "to orchestrate and deploy tasks, resources, and activities in the new operational capabilities". (Pavlou and El Sawy 2011) The second view complements the extant theories by asserting that DCs emerge and operate through productive dialogue and interpersonal participation rather than stemming from skills of "a few … top executives" or being "abstract, firm-level entities". Employees "connected through high-quality relationships" and empowered for "innovative potential" are suggested as the essence of developing DCs. (Salvato and Vassolo 2018) Finally, the relationship of DCs to organizational learning (e.g. Levinthal and March 1993) and change management (e.g. Burnes 2004) theories remain to be assessed as a refinement of the current theoretical frame.

Case Description and Method

We initiated a longitudinal, interpretive case study (Yin 2018) to understand complex organizational capability development processes. The case company operates within public sector materials and services procurement and logistics in a Nordic country. The company employs approximately 240 people in three locations. The data were collected between November 2018 and May 2019 by three qualitative semi-structured group discussions and 14 individual interviews among management and staff from different functional areas. During data collection, significant organizational, technological and process changes influencing both internal and customer-facing functions were under implementation. The overall change was at an early stage. The first two group discussions were held with the executive team to understand the vocabulary and

topical issues, and to collect feedback for ensuring that participants were able to relate to the questions. The final interview themes included organizational change and development, the goals and vision of the organization, key competencies and capabilities, and technology use and its effects on work. All sessions were recorded as audio and in researcher notes. Session durations varied from 40-90 minutes. Audio capture excluded the introducing of research objectives, the addressing of questions from participants, and the concluding of session. Recordings thus range from 32-54 minutes in the individual interviews and from 76-79 minutes in the group discussions with an average duration of 50 minutes. While addressing the semi-structured themes, participants were encouraged to discuss their views in addition to answering interview questions. The initial findings were derived inductively by listening to and taking notes from the recordings as well as drawing a map of initial codes and categories depicting items and phenomena relevant to capability development. The findings were validated by our presenting and discussing them with the organization's management and research participants. Systematic coding of data (Corbin and Strauss 1990) is in progress and remains to be presented as subsequent work. Throughout the analysis, the hermeneutic circle is utilized as a guideline (Klein and Myers 1999).

Initial Findings

Three types of contradictory phenomenon, contradictions in *work development, organizational development,* and *technological development,* between supporting change and hindering change emerged from the data. They are presented in Table 1 with exemplars. The left side illustrates strengths supporting change, and the right side represents pain points hindering change.

Exemplars of strengths supporting change	**Exemplars of pain points hindering change**
1: Contradictions in work development	
Aspiration toward expertise, such as learning, developing end-to-end understanding, and customer orientation. *"[The staff] take the customer into consideration in different ways, and carry out a lot of conversation with them, engage them. … They give good ideas of how to develop things."*	**Challenge of obtaining room for development in everyday work**, such as availability of resources, and accessibility of training. *"This is just a worrying situation now at the moment, as we work almost like a production line through these processes …, and we don't have time to put our hearts into self-development that much."*
2: Contradictions in organizational development	
Perception of the organization's moving forward, such as innovative approach by management, investment in development initiatives, and management of change by development projects. *"[W]e are even very innovative with the development projects. … [W]e think a little bit outside the box and dare to do. … [O]ne should courageously think about what is new."*	**Challenge of sustaining manageability of change**, such as involving the stakeholders, retaining clarity of the renewing processes, and creating real understanding of change implications among parties. *"I would probably come again to training and … finding the right people. … [T]hat people would really know what is coming and where we are going. … [W]e should get an even deeper [understanding] of what we are doing."*
3: Contradictions in technological development	
Openness to utilizing technology and data in new ways, such as appreciating the importance and potential of data and management by information, and expectations of gaining advantages by new technology. *"[A pilot program for a new technology is] very welcome. For instance, we have certain reports, so it is quite handy that it can generate them with certain criteria."*	**Challenge of utilizing technology to the fullest**, such as seamless data flow, interoperability of systems, increasing understanding of system functionalities and workflows, and availing of expertise from different functions. *"[T]o involve broadly enough those people who are experts in the work. To give insight and understanding on the topic. [Without utilizing experts] it is hard to reach the same level."*

Table 1. Contradictory Phenomena Between Supporting and Hindering Change

We propose that the contradictions illustrate the interplay of operational capabilities and DCs. To demonstrate this, we will next discuss the relationship of the contradictions with *sensing, learning, integrating* and *coordinating capability* following Pavlou and El Sawy (2011). We suggest that the *contradictions in work development* influence the ability to adjust operational capabilities at primarily the everyday work level. First, in strengthening and diversifying the existing capabilities in daily processes. Second, in learning

and integrating new expertise in process areas under transformation. Finally, in identifying new practices or capability gaps on all levels of the organization through both existing processes and those under renewal. Thus, this contradiction is seen to influence both learning and integrating capabilities. The *contradictions in organizational development* reflect in changes conducted as systematic, project-type undertakings, such as implementing a new system with new processes. Where the first contradictions primarily touch everyday learning, the second manifest particularly during transformation. Here, integrating capability, creating deep and shared understanding, and making sense of the goals and implications of changes becomes pronounced. Coordinating capability is illustrated especially in the exemplar of retaining clarity of the renewing processes. Lastly, while the exemplars in the *contradictions in technological development* may be familiar as traditional system development challenges, the last two concern how the understanding of system functionalities and workflows can be deepened, and organizational expertise utilized broadly in system development. These relate to learning, integrating and coordinating capabilities. Particularly, seamless data flow and interoperability of systems would link to integrating and coordinating capabilities, while availing of expertise from different business and support functions would manifest as integrating capability. Utilizing technology to the fullest would show traits of sensing capability, such as in identifying novel uses of technology.

Discussion and Conclusions

We seek to understand how dynamic capabilities of organizations develop in digital transformation. Many of the findings relate to understanding and participation across an organization. Especially the second contradiction resonates with the proposition that "productive dialogue will improve the rates of … mutual learning, and cohesion among employees engaged in change initiatives" (Salvato and Vassolo 2018). It seems that complex concurrent changes require a heightened understanding by employees of why the change is being made, the status of the change, and what is expected of them in order smoothly to adopt its initiatives. It may be that by intensive dialogue and participation learning and integrating capabilities (Pavlou and El Sawy 2011) in particular could be strengthened and utilized to their full potential. The findings also indicate that dynamic inter-personal capability extends not only to management–management (cf. Salvato and Vassolo 2018) but also to management–employee and employee–employee interactions. We thus suggest DCs to be multi-level constructs, particularly so in areas undergoing major transformation. The required intensity of such capability may depend on both functional area and timing. As processes and the digital landscape change, for an organization to respond and evolve requires sensing, seizing and transforming capability (Teece et al. 2016) at all levels. This may show as ability to detect the silent signals of processes not working as intended, unforeseen opportunities and consequences of new systems being implemented, or neglected areas of development. For instance, new uses for systems resulting in more agile data utilization may emerge, as DCs are encouraged and exercised throughout the organization.

Additionally, the three presented types of contradictory phenomenon could be seen as tensions between *what* and *how*. The *what* seems to be supportive of change in everyday work, organizational direction, and technology utilization. The identified pain points of the *how* appear as contradictory forces, hindering the change by challenges such as creating space for everyday development, or gaining unified understanding of complexities introduced by more technology-intensive operating models. (cf. Fairhurst and Putnam, 2019) We propose that these contradictions could be addressed especially by learning, integrating and coordinating capabilities (Pavlou and El Sawy 2011) through productive dialogue and intensive participation (Salvato and Vassolo 2018). These capabilities may become more important as technology use intensifies creating requirements for rethinking processes, more numerous data points, and interdependencies and constraints among systems. We, therefore, propose that the study also complements Yeow et al. (2018) regarding tensions and contradictions, including their discovery that "sensing, seizing and transforming actions occurred throughout the aligning process, albeit in different proportions". Finally, the primary limitation concerns the current lack of discussion from the organizational learning (Levinthal and March 1993) and change management (Burnes 2004) perspectives, which remain to be addressed during further data collection and analysis cycles. We also recognize the generalizability challenge of a single-case study, and thus our primary aim of generalization is theory expanding (Yin 2018). To conclude, through rich data and systematic analysis, we anticipate empirically grounded understanding on how dynamic and operational capabilities evolve together with change across organizational levels. As a result, we expect practical implications to managing these capabilities, and a contribution to theory as new insight into dynamic capability development in digital transformation.

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